

North Carolina Highway Bulletin

VOL. III

JUNE, 1922

NO. 4



A BEAUTIFUL ROAD IN WESTERN NORTH CAROLINA

T
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C
O

—in North Carolina

North Carolina has constructed about one and a half million square yards of TEXACO ASPHALT pavements, consisting of all types, including Texaco Sheet Asphalt, Texaco Asphaltic Concrete and Texaco Asphalt Macadam.

These pavements have been laid on Federal-Aid and State projects, on county highways and city pavements. They are carrying today North Carolina's heaviest traffic in all parts of the State.

TEXACO ASPHALT pavements in North Carolina are durable, resilient, lasting, waterproof—and economical. Thousands of square yards have been laid on the old macadam and gravel roads of North Carolina, and the State has saved much of the taxpayer's money by utilizing these worn-out highways as foundations for TEXACO ASPHALT pavements.

Another thing: Every city in the United States east of the Rocky Mountains with a population of 155,000 and over (except two) has laid and is getting excellent service from thousands of square yards of TEXACO ASPHALT pavements.

ASPHALT

The Texas Company

ASPHALT SALES DEPARTMENT

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New York City



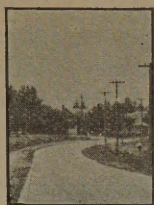
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Boston

Jacksonville
Atlanta
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Memphis

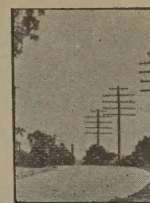
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NORTH CAROLINA HIGHWAY BULLETIN



Vol. III, No. 4

H. K. WITHERSPOON, Editor

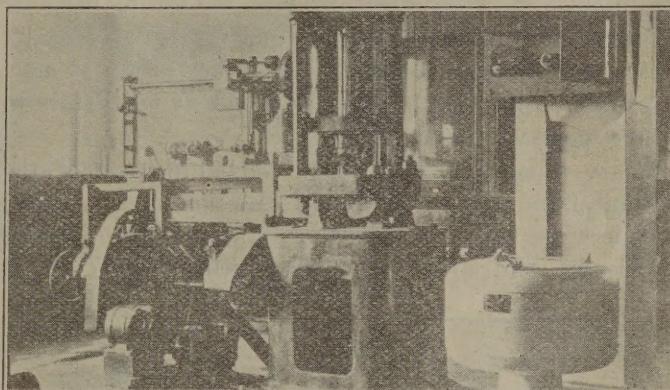
JUNE, 1922

The Chemical Laboratory of the North Carolina Highway Commission

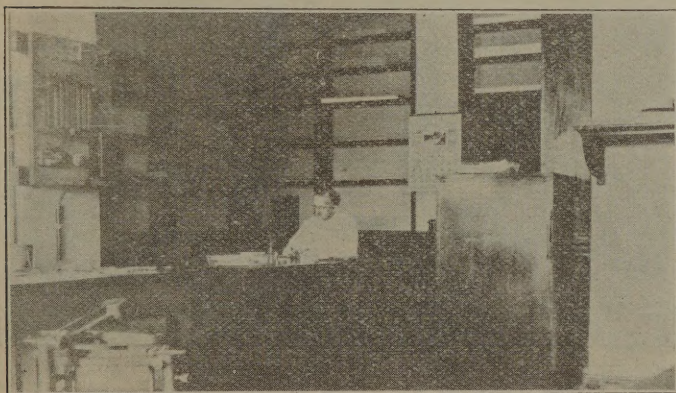
By R. L. OBERHOLSER, *Chief Chemist*

IT is a conceded fact that all well organized road programmes include in the organization a well equipped and efficient chemical laboratory, to keep a check upon all materials that enter into the different types of road that the Highway Commission may deem proper to build. To construct one mile of bad modern road where laboratory supervision has not been taken advantage of will cost more than to build a modern road building laboratory for all time and at a cost of one fourth the amount expended on that one mile and be the means of correcting any future mistakes. No other investment in road building pays as large interest on the investment. This is particularly true for the bituminous type of construction. Your engineering work can be of the highest type obtainable from a professional standpoint but a poorly equipped and inefficient laboratory can bring disrepute upon the whole organization.

a properly equipped laboratory to take care of the enormous programme that they were called upon to carry through. It was decided that the chemical laboratory would occupy two rooms on the fourth floor of the new Highway Commission Building located on Morgan St., Raleigh. These rooms are of ample size to antici-



CENTRIFUGAL AND TENSILE MACHINES WITH HOOD IN BACKGROUND



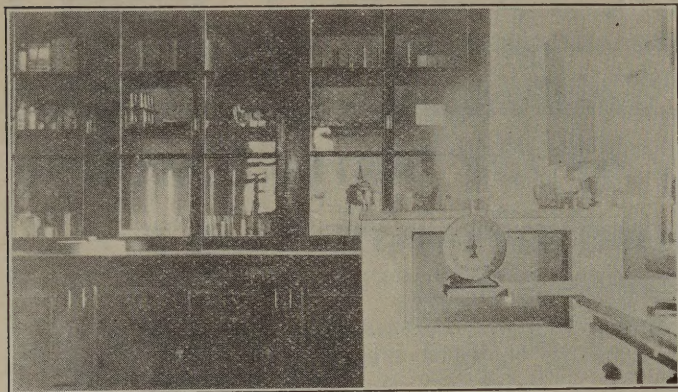
SHOWING ROTAP AND LABORATORY OFFICE

Today we face the criticism of men who know the modern construction of roads and to admit of materials that would not produce the best type of construction would be suicidal and this is where the laboratory acts as a directing force as to the selection of the very best materials that are obtainable. This only emphasizes more emphatically the needs of a well equipped laboratory for the building of modern roads. The State Highway Commission saw the necessity of maintaining

pate any future work that may develop. Light and ventilation are well provided for, which makes for a better performance of laboratory work. The laboratory is required to make analysis of steels, paints, oils, pigments, cements, limestones, creosotes, topeka road construction, sheet asphalt, willite, top soils, sand asphalts, waters, tars, asphalts, and sand gradings for the different types of road construction. To adequately take care of this work, the arrangement and equipment were taken care of along practical lines to attain the highest efficiency in the efforts expended. To give one a better idea of the laboratory arrangement and equipment a number of views were taken, but while a general idea may be had the laboratory in its entirety can not be photographed to advantage. From view number one you obtain a picture showing the Rotap which we use to make all grading tests of sands, topekas and Willites. The electrical control board placed against the pillar is used to operate a centrifugal of which a better view can be had in view number two. This centrifugal is

used for paint and sheet asphalt work. The remainder of the space is devoted to office work and is supplied with two flat top desks, filing cabinets, typewriter, and inter-office telephone with outside connection to get in touch with field inspectors regarding the work.

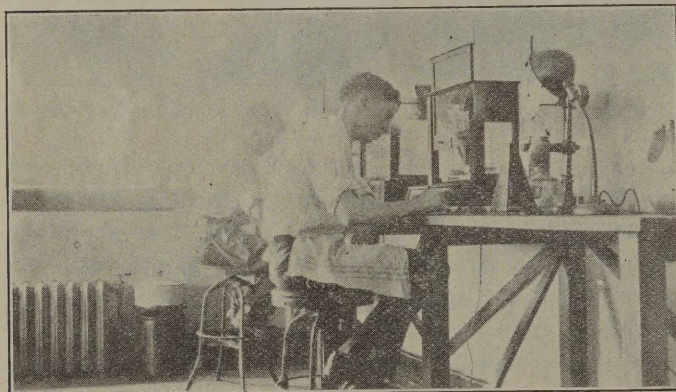
From view number two you get a clearer view of the



CABINET FOR STORING APPARATUS

centrifugal spoken of in view number one; also the testing machine used for tensile tests of steel and compression tests of bituminous materials. While hard to distinguish the hood directly behind the testing machine it serves its purpose admirably and is ten feet long by thirty inches deep and thirty-two inches to top of marble slab. This hood is fitted with patent ventilators to insure good ventilation at all times.

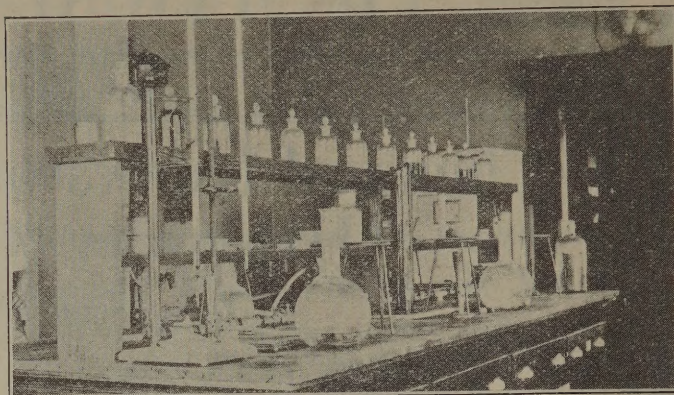
View number three gives a partial picture of the chemical and apparatus cabinet, also the Freas constant temperature bath for asphalt penetrations which is automatically controlled at a temperature of 77°F, at



BALANCE TABLE

which these tests must be conducted. The balance shown on the extension from the desk proper is used to take daily densities of road samples which are sent from each bituminous road job. This I have found to be of great value as a check on our road construction. You have been shown a partial glimpse of the entrance room to the laboratory by views number one, two, and three; now we will ask you to consider view number four which is our work room, showing the balance table with balances and lighting arrangements. The balance table was constructed with the idea of doing the weighing

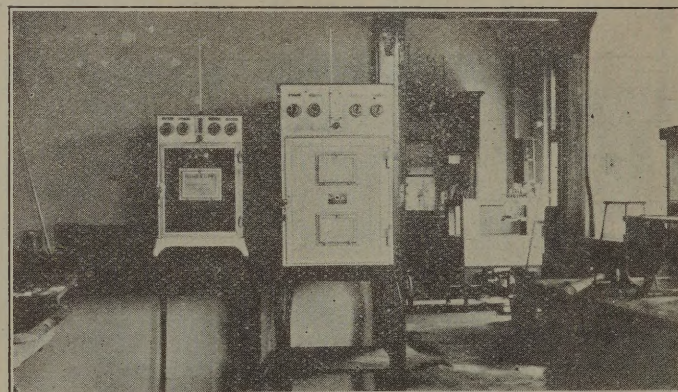
comfortably and at the same time in an efficient manner. The height of the balance table was given due consideration and revolving stools instead of chairs are supplied, giving a quicker get away from the balance. This all goes for efficiency and is received by the practical chemist as a decided improvement.



CHEMICAL WORK TABLE

Sitting on the floor against the rear of this view is a Dulin Rotarex held for emergency use and while it is not shown on any view just how the Dulin are placed they are used to extract the bitumen from all bituminous road samples except sheet asphalt.

View number five is the chemical table where all work from a chemical standpoint is carried on. This table is supplied with all the necessary chemicals that will be ordinarily required in performance of the work. Gas supply for both sides of the table and ample drawer room is provided to insure apparatus and materials being of easy access.



ELECTRIC OVENS—UNIFORM TEMPERATURE BATH IN BACKGROUND

While view number six was taken to show the Freas electric ovens you get a better insight into the rooms given over for laboratory use. The Freas ovens are maintained at given temperatures to meet the needs of our work at all times.

In conclusion, while not the greatest asset a laboratory can have, we have been provided with awnings and fans to make more endurable the work that has to be carried on where so much heat exists at all times.

Such provisions for comfort of the laboratory force brings forth better effort and certainly more efficiency.

The Elimination of Grade Crossings

SCARCELY a day passes that one does not read in the daily papers of a grade crossing accident in which an automobile is struck by a train and several persons killed or injured for life thus keeping fresh in the minds of the public the urgent necessity of doing away with these crossings as rapidly as possible. The enormity of the problem however renders it impossible to do away with every grade crossing, chiefly from the tremendous outlay that would be necessary. At the present time, as everyone knows, all of the railroads are finding it difficult to meet running expenses and for them to make an expenditure of this size over a short period of time would be obviously impossible.

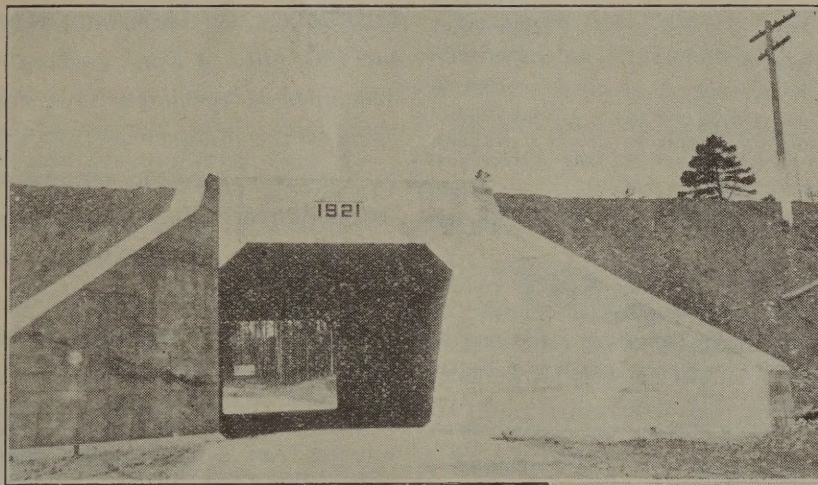
Not only are the railroads confronted with this enormous problem but the State Highway Commission is confronted with a difficulty of like proportions. Very often when a new location is being

made for a road in order that a crossing may be eliminated there is some criticism of the expenditure that is necessary because of the realignment; but when one stops to consider that the value of a grade crossing elimination should be measured in the value of human lives and not in dollars and cents the extra money spent in realignment is well invested. Regardless of how safe a grade crossing is there will come a time when someone will be killed or injured at that particular place—hence the necessity for the ultimate elimination of all crossings of this character. Very often, however, it is not necessary to call on the railroads to build overhead or undergrade crossings, for a slight change of alignment will bring about the desired relief. The writer has in mind one very striking example of this kind on the road between Statesville and Charlotte where eight crossings were done away with in a distance of twenty-six miles.

One of the most important agreements made by the Highway Commission along the line under discussion

was concluded a short time ago when State Highway Commissioner Frank Page and representatives of the Southern and Carolina, Clinchfield and Ohio railways met for the purpose of discussing ways and means of doing away with certain dangerous crossings in the State. As a result of this conference the Commission and the railroads mentioned will cooperate in the construction of five undergrade or overhead crossings at the following points: at Cary, Wake County; at Old Fort, McDowell County; at Dillsboro, Jackson County; at Willetts, Jackson County; and at Forest City, Rutherford County. The cost of construction of these structures will be borne

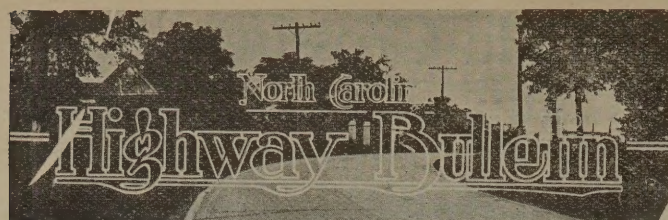
equally by the State Highway Commission and the railroads except in the case at Old Fort where the Commission will pay three-fourths of the cost. The cost of eliminating the average grade crossing in this manner is about \$30,000 but who will dispute that it is money well invested.



NO MORE GRADE CROSSING ACCIDENTS WILL HAPPEN HERE

Commissioner Page set somewhat of a precedent in dealing directly with the railroads in the matter of eliminating grade crossings as it has been customary heretofore to apply to the Corporation Commission for the necessary relief, but it should be said in justice to the railroads that a willingness was shown to do everything possible towards the accomplishment of the aim in view the only drawback being lack of finances with which to do the work.

For reasons set out in the beginning of this article it is evident that grade crossings will be with us for some time to come; therefore it behooves the motoring public to make the best of a necessary evil. This can be done by observing extra precaution when driving across tracks, always making sure that no trains are approaching in either direction. The delay that is necessary in doing this will be well worth while. Statistics prove that a large number of grade crossing accidents are caused through the carelessness of the motorist to 'Stop, Look, Listen'!



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NORTH CAROLINA STATE HIGHWAY COMMISSION
RALEIGH, NORTH CAROLINA

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This BULLETIN will be sent gratis to any State or county official, contractor, newspaper, trade publication, library, or other person interested in the improvement of roads and in the work of the Commission. Advertising rates may be obtained on application.

Volume III

June, 1922

Number 4

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Editorial

The Editor wishes to apologize for the shortage of reading matter in this issue. Part of the reading matter that was expected for publication failed to arrive at the last minute.

Early in the year the Commission announced as its slogan "1000 miles in 1922." Of that mileage 400 miles were to be immediately hard surfaced and the remaining 600 to be graded and surfaced with topsoil, gravel, or sand clay. Figures compiled as of June 1st show that over half of this mileage has been let and the majority if it under construction. On the above date a total of 546 miles of work had been let at an estimated cost of \$10,076,795. Of this amount \$6,634,051 will be expended for 226 miles of hard surfaced roads; \$3,115,056 for 320 miles of the lower type roads; and \$328,000 for bridgework. Sixteen projects are scheduled for letting in June and eighteen tentatively listed for the July letting which will very materially increase the total mileage under contract.

To take care of and to adapt for use in highway work the immense amount of surplus war material which has been received from the government the Highway Commission has a thoroughly organized and completely equipped garage located about four miles from Raleigh. In the next issue of the Bulletin a description of the plant will be given. The article will be illustrated by a number of interesting photographs and will also describe some of the unique uses that have been made of some of this surplus war material.

After July 1st all cars used by the State Highway Commission will bear regulation licenses, the only difference being an "H" stenciled near one end. The numbers will run as before as 100-199 for cars allotted to the First District; 200-299 for Second District, and so on.

North Carolinians are evidently beginning to appreciate the beauties of their home State if the number of auto trips that are being taken towards the western part of the State are to be taken as a criterion. There are numbers of requests each day at the office of the Commission for information regarding routes and road conditions. This condition is brought about largely by the greatly improved condition of the State roads.

Contracts Awarded May 25th

Approximately 143 miles of road construction were added to the large construction program now under way by the letting held May 25th when bids were opened on eighteen projects. On account of prices bid three of the projects were not awarded but were held over for future letting. Classified by districts the following are the results of the letting:

Third District

Project No. 312, Brunswick County, consisting of 9.77 miles between the Brunswick County Line and Leland, was awarded to the Alabama Concrete Products Company, of Selma, Alabama, for the grading and surfacing with plain concrete, at a cost of \$302,834.00 while the structures on the same project were awarded to the Batson-Cooke Company, of West Point, Ga., for approximately \$13,000.

Project No. 316, Brunswick County, 12.12 miles from intersection of Wilmington-Charlotte-Asheville Highway to Bolivia will be graded and surfaced with sand clay by B. Frank Price, of Mullins, S. C., at a cost of \$46,115.00 while the structures were let to Batson-Cooke Co., West Point, Ga., for \$25,000.

J. A. Kreis, of Knoxville, Tenn., was low bidder on Project No. 327, Columbus County, 5.2 miles from Brunswick County line to Freeman and was awarded both roadway and structures for approximately \$34,000, the surfacing to be of sand clay.

Project No. 340, Cumberland County, 11.07 miles between Fayetteville and Little Rockfish Creek, was also bid in by the Alabama Concrete Products Co., for \$335,000, this figure covering grading and paving with plain concrete. The structures were awarded to Hobbs-Peabody Construction Co., of Blacksburg, S. C., for \$11,000.

Project No. 364-B, Onslow County, 12.84 miles between Dixon and Jacksonville, was awarded to A. W. McClay, Richmond, Va., on a bid of approximately \$90,000 for both roadway and structures. Topsoil will be used for the surfacing.

Fifth District

The grading and surfacing of 17.53 miles of the Graham-Ashboro road, lying between Graham and the Randolph County line and known as Project No. 502, was awarded to W. E. Graham, of Mt. Ulla for \$68,000 and the structures to Hanford Bros., of Burlington for \$62,000. Project No. 545, 9.2 miles in Hoke County between Raeford and the Scotland County line was awarded to O. A. Mann & Co., of Lagrange, Ga., for \$35,000, this including only the grading and topsoil surfacing. The structures on the same project were bid in by A. W. McClay, of Richmond, for \$16,281.00.

J. A. Kreis, of Knoxville, Tenn., was low bidder on the choicest hard surface project let on the above date and as such was awarded the contract for 17.98 miles of the National Highway, route 70, between Reidsville and the Virginia State line. Project No. 593, as it is known, is located for the most part in Rockingham County though on the upper end it runs through the corner of Caswell County. Plain concrete will be used for surfacing on the project which cost in round figures \$478,000 or an average of \$26,500 per mile. This is the longest stretch of hard surface road that has been let as a single contract by the Commission.

Sixth District

Project No. 614, Cabarrus County, 9.2 miles on route 15 between the Mecklenburg County line and Concord, was awarded to A. L. Harris, of Dillsboro and Oliver & Costello Bros., of Knoxville, Tenn., the former to do the grading and surfacing and the latter the structures. The entire cost of the project will be approximately \$318,000.

The Southern Construction Company of Atlanta, Ga., were low bidders on Project No. 670 and were awarded both roadway and structures for \$129,000. This work is located between Kannapolis and Luther's Church, the 4.53 miles included to be surfaced with plain concrete.

Seventh District

Project No. 719, Caldwell County, a reinforced concrete bridge near Hudson, was awarded to Cottrell and Howard, of Lenoir for approximately \$4,500.

Project No. 741, Forsyth County, consisting of 8.9 miles of road between Hanes and the Yadkin River was awarded to the Hardaway Construction Company, of Charlotte. The roadway will be paved with reinforced concrete at a cost of \$286,387.00.


Ninth District

Project 913, Cherokee County, 10.33 miles between Murphy and the Georgia State line, will be surfaced with waterbound macadam by the Mills, Williams Construction Co., of Winchester, Ky., at a cost of \$87,000.

Project 953, Jackson County, 12.72 miles between the Macon County line and Dillsboro will be graded and the structures built by C. C. McCabe, of Tuxedo, N. C., for \$106,000.

Project 954, Jackson County, 1.68 miles of road between Sylva and Dillsboro, will be graded and surfaced with plain concrete by the Mills-Williams Construction Co., of Winchester, Ky., for \$67,000.

New Roads Authorized *for* Construction

 SOMETHING over 350 miles of new road work was authorized by the State Highway Commission at the May meeting to be let to contract as soon as the necessary details of engineering can be carried out. A larger percentage of the authorized projects will be of sand clay and topsoil construction due to the fact that with the contracts already under way and those to be let in the immediate future the limit has been reached in the production of materials necessary for hard surface construction and more mileage of the lower class of construction will be necessary to maintain an economic balance.

The following is a list of new projects authorized:

First District

Project 104B—Beaufort, repairs to bridge at Leechville.

Project 105A—Beaufort, 2.0 miles hard surface, Belhaven to Leechville.

Project 105B—Beaufort County, 5.0 miles hard surface from end of present pavement E. of Washington toward Belhaven.

Project 115—Chowan-Perquimans, Edenton to Hertford, 12.5 miles.

Project 126—Edgecombe, Tarboro to Pitt County line, 8.35 miles on Williamston road.

Project 127—Tarboro to Halifax line, 12.2 miles.

Project 128—Edgecombe, Tarboro to Pitt line, 17.4 miles on Farmville road.

Project 129—Edgecombe County, from road No. 12 near Crisp to Wilson County line, 8.1 miles.

Project 134—Gates, Chowan County line to Virginia State line, via Sunbury, 16.5 miles.

Project 141—Halifax-Edgecombe counties, Whitakers to Halifax, 20.1 miles.

Project 147—Hertford-Bertie, Winton to Aulander, 16.8 miles.

Project 177—Perquimans-Chowan, Winfall via Belvidere to Edenton-Sunbury road, 12.5 miles.

Project 188—Pitt, Edgecombe County line, to Greene line, via Farmville, 10.7 miles.

Second District

Project 212—Craven, 2.8 miles from Havelock to Carteret County line.

Project 220—Duplin, hard surface, Wayne County line to Warsaw, 16 miles.

Project 273—Sampson County, paving from Clinton to Williamston's store, 9.0 miles.

Project 282—Wayne, 13.0 miles hard surface, Goldsboro to Duplin County line.

Project 293—Wilson, hard surface, from end of pavement E. of Wilson to Greene County line, 8.0 miles.

Third District

Project 328—Columbus, hard surface, Whiteville to Chadbourn, 7.0 miles.

Project 342—Cumberland, 6.0 miles hard surface, Hope Mills to Fayetteville.

Project 351—New Hanover, resurfacing from Wilmington to Castle Hayne, 8.8 miles.

Project 366—Onslow, bridge over New River at Jacksonville.

Fourth District

Project 437—Harnett, Lillington to Duke, 11.0 miles.

Project 438—Harnett, Duke to Dünn, 4.0 miles hard surface.

Project 486—Wake, Apex to Chatham County line, 9.0 miles.

Project 421—Franklin, Franklinton to Wake County line, 9.5 miles hard surface.

Project 431—Granville, Berea to Person County line, 4.0 miles.

Project 446—Lee County, extension of hard surface.

Fifth District

Project 540—Reconstruction shoulders on Greensboro-Highpoint road.

Project 543—Hoke pavement in Raeford, 0.5 mile.

Sixth District

Project 602—Alexander, penetrating macadam pavement of road from Taylorsville to Iredell County line.

Project 608—Anson, 8.0 miles hard surface, Wadesboro to Polkton.

Project 640—Iredell, penetration macadam from Alexander County line to Hickory road, 8.1 miles.

Project 641—Iredell, hard surface from Statesville to Little Yadkin River, 8.0 miles.

Project 643—Iredell, hard surface from Statesville to Rowan County line, 8.0 miles.

Project 644—Iredell, hard surface from Statesville to end of Project 640, 2.0 miles.

Seventh District

Project 714—Ashe, West Jefferson to Baldwin, 7.5 miles.

Project 721—Caldwell, Lenoir to Wilkes County line.

Project 723—Caldwell, reconstruction on Lenoir-Blowing Rock turnpike.

Project 762—Surry, Mt. Airy to Fancy Gap, 5.1 miles hard surface.

Project 763—Surry, Mt. Airy to Stokes County line, via Pilot Mountain.

Project 764—Surry, 2.0 miles hard surface between old new Westfield roads through Pilot Mountain.

Project 765—Surry, hard surface from Yadkin County line through Elkin to Dobson road.

Project 770—Watauga, Caldwell County line to Boone, 11.5 miles.

Project 771—Watauga, Boone to Tennessee line, 14.0 miles.

Ninth District

Project 943—Haywood, reconstruction from Junaluska to Fines Creek, 12.7 miles.

Project 973—Madison, Mars Hill to Sams Gap at Tennessee line, 17.0 miles.

STATUS OF FEDERAL AID WORK IN NORTH CAROLINA

Projects Under Construction

"H S" denotes any type of hard surfaced road.

"G" denotes any type of gravel, sand-clay, or topsoil road.

NO.	COUNTY	LENGTH	TYPE	APPROXIMATE COST	BEGUN	CONTRACTOR
4	Craven	9.46	G	\$ 21,089.23	10-12-19	County Commissioners.
15	Guilford	4.205	H	5,441.75	9-1-17	County Commissioners.
16	Haywood	14.27	G	64,705.05	7-26-19	County Commissioners.
17	Wilkes	17.6	G	101,386.08	10-15-18	County Commissioners.
61	New Hanover	2.186	G	234,841.39	7-12-20	C. W. Lacy.
66	Haywood	6.18	G	105,296.45	9-15-20	O'Brien Construction Co.
68	Sampson-Harnett	27.4	G	305,225.54	7-23-20	P. R. Ashby—F. L. Grant, Inc.
69	Transylvania	9.348	G	231,409.04	3-25-20	Allport & Alexander Construction Co.
70A	Jackson	4.83	G	150,081.11	8-18-20	Wright & Nave.
75	Columbus	7.06	G	66,605.38	12-9-20	County Commissioners.
86A	Martin-Bertie	3.09	G	98,454.67	2-25-20	State Forces.
86B	Martin-Bertie		Bridges	332,308.83	3-19-21	Boyle-Robertson Construction Co.
94A	Mitchell	5.04	H S	190,375.13	6-22-20	Gibson Construction Co.
99B	Chatham	21.82	G	259,931.59	11-19-20	J. T. Plott—Atlantic Bridge Co.
117	Wilson	6.25	G	41,828.93	3-8-21	County Commissioners—Lee J. Smith.
120	Bladen	23.67	G	105,688.55	2-16-21	J. A. Marrow—P. R. Ashby.
125A	Alleghany	4.99	G	153,899.13	11-22-21	W. E. Graham.
127	Wilson	7.63	G	33,780.45	3-5-21	County Commissioners—Lee J. Smith.
136	Davie	6.99	G	61,733.04	2-14-21	Chandler & Ragland—Hagedorn Const. Co.

Projects Completed

NO.	COUNTY	LENGTH	TYPE	APPROXIMATE COST	COMPLETED	CONTRACTOR
1*	Mecklenburg		Bridge	\$ 59,224.90	9-5-18	C. W. Requarth & Co.
2*	Henderson	7.75	G	33,141.74	12-17-19	State Convict Labor.
3*	McDowell	2.85	G	24,405.73	12-17-19	County Commissioners.
5*	Burke	8.03	G	19,888.05	11-1-19	County Commissioners.
8*	Cumberland	13.46	G	62,800.71	6-20-21	County Commissioners.
9*	Polk	12.78	G	68,175.45	4-15-21	County Commissioners.
11*	Lenoir	1.78	H S	56,893.18	1-25-21	West Construction Company.
12*	Wayne	8.62	G	26,727.98	11-2-20	County Commissioners.
13*	Wayne	12.573	G	101,467.23	12-1-21	County Commissioners.
14*	Halifax	8.01	G	19,017.83	8-20-29	State Convict Labor.
18*	Alexander	9.8	G	66,446.49	3-31-21	County Commissioners.
19*	Rockingham	8.21	G	32,759.36	11-11-19	County Commissioners.
20*	Yadkin	6.41	G	25,146.45	7-26-20	County Commissioners.
21*	Person	7.675	G	25,911.04	3-15-20	County Commissioners.
22A*	Alamance	1.196	H S	30,103.48	6-27-19	County Commissioners.
22B*	Alamance	8.3	H S	290,179.36	8-19-21	Powell Paving and Construction Co.
23*	Burke	7.68	G	42,873.90	1-1-20	Lovelady Township Forces.
24*	Wake	4.24	H S	127,840.21	11-30-19	W. W. Boxley & Co.
25*	Person	8.175	G	101,537.51	10-20-20	County Commissioners.
26*	Davidson	8.41	G	14,115.96	10-1-19	County Commissioners.
27A*	Orange	8.235	G	53,945.73	4-23-21	W. S. & L. A. Crawford.
29*	Union	8.655	G	58,949.25	4-8-21	County Commissioners—J. S. Stearns.
30	Mecklenburg	6.304	H S	102,551.35	3-31-21	County Commissioners.
31*	Buncombe	3.1	H S	70,174.88	10-24-19	County Commissioners.
33	Montgomery	3.72	G	15,246.71	6-8-21	County Commissioners.
34	Wayne		Bridge	50,798.00	10-8-21	Roanoke Bridge and Iron Works, Inc.
35*	Forsyth	1.87	H S	59,867.61	2-25-20	County Commissioners.
36*	Durham	3.46	H S	115,075.57	12-15-19	R. G. Lassiter & Co.
37	Gaston	10.38	H S	167,173.23	12-28-21	County Commissioners.
38*	Rockingham	10.92	G	46,809.92	9-17-20	County Commissioners.
38A	Caswell	6.67	G	50,907.23	7-6-21	Bolton Construction Co.
39	Union	10.61	G	74,337.71	4-9-21	County Commissioners—J. S. Stearns.
40*	Union	4.287	G	18,434.20	12-11-20	County Commissioners.
41	Watauga	8.95	G	94,681.29	11-10-21	County Commissioners.
42*	Stanly	11.67	G	80,922.15	9-10-20	Gibson Construction Co.
43*	Beaufort	2.2	H S	95,089.12	5-11-20	Simmons Construction Co.
44*	Granville	4.57	G	51,377.43	4-20-21	T. W. Chandler—P. R. Ashby.
45*	Buncombe	7.852	H S	359,777.28	7-23-21	H. A. Wells-Asheville Const. Co.—Asheville Paving Co.
47*	Guilford	4.607	H	162,689.83	4-8-21	County Commissioners.
48A*	Northampton	5.804	G	60,620.51	10-30-20	Virginia Contracting Co.
48B	Northampton	2.69	G	44,749.65	10-4-20	Porter & Peck—A. C. House.
49	Lenoir	6.017	H S	199,872.19	6-1-21	T. H. Gill & Co.—West Construction Co.
50*	Guilford	2.65	H S	101,596.44	12-31-20	County Commissioners.
51	Guilford	2.26	H S	87,603.12	9-27-20	County Commissioners.
52*	Cabarrus	8.986	G	162,399.61	3-22-21	Gibson Construction Co.—J. E. Lane.
53	Lenoir	7.234	H S	\$ 246,838.20	2-10-21	T. H. Gill & Co.—West Construction Co.
54*	Wake	6.811	H S	239,736.26	8-23-20	R. G. Lassiter & Co.
55A*	Mecklenburg	6.008	H S	196,899.73	12-28-20	Simmons Construction Co., Inc.

STATUS OF FEDERAL AID WORK IN NORTH CAROLINA---Continued.

Projects Completed, (Continued.)

NO.	COUNTY	LENGTH	TYPE	APPROXIMATE COST	COMPLETED	CONTRACTOR
55B	Mecklenburg	4.59	H S	188,445.18	8-13-21	Simmons Construction Co., Inc.
56*	Forsyth	5.868	G	47,709.31	10-29-20	C. B. Hester—Luten Bridge Co.
57	Rowan	6.75	G	72,549.27	4-22-21	W. E. Graham—R. M. Hudson Co.
58	Johnston	6.018	G	69,453.50	5-22-22	P. R. Ashby.
59	Columbus	11.025	G	106,872.26	1-26-22	County Commissioners.
60	Lenoir	7.88	H S	259,445.25	4-00-22	T. H. Gill & Co.—West Construction Co.
62	Buncombe	3.43	H S	139,191.32	11-00-21	H. C. McCrary, Inc.—Asheville Construction Co.
63*	Buncombe	3.76	H S	167,933.55	9-20-21	Allport & Alexander Construction Co.—H. C. McCrary, Inc.—Asheville Paving Co.
65*	Pitt	9.57	G	99,181.06	10-20-21	Porter & Peck.
67*	Nash	8.81	H S	384,126.08	4-20-21	R. G. Lassiter—Atlantic Bridge Co.
71	Durham	6.69	H S	319,153.39	10-26-21	State Forces.
72*	Anson	3.896	G	70,470.89	3-4-21	Gibson Construction Co.—J. A. Kreis & Co.
73	Nash	8.73	G	159,913.16	4-10-22	Porter & Boyd.
74A*	Stanly	2.803	G	25,537.45	8-20-20	County Commissioners.
74B	Stanly	4.92	G	63,411.26	5--21	County Commissioners.
76*	Cabarrus	1.35	H S	54,583.76	10-29-20	R. M. Hudson & Co.
77*	Rutherford	2.206	H S	100,159.44	9-5-21	E. T. Belote.
78A	Rutherford	9.64	G	88,230.71	8-3-21	Ross Brothers.
78B*	Rutherford	10.26	G	71,056.48	8-3-21	Ralph E. Oliver.
79*	Cleveland	1.645	H S	67,063.64	10-30-20	Noll Construction Co.
80A	Montgomery	16.6	G	226,516.20	6-20-21	County Commissioners.
80B	Montgomery	11.07	G	65,145.02	10-25-21	Lee J. Smith Const. Co.—P. R. Ashby.
81	Pender	26.11	G	273,439.45	12--21	Porter & Boyd.
82	Davidson	4.54	G	59,983.71	12-18-20	Heilig & Sherrill.
84A	Burke-McDowell	8.33	G	128,193.76	8-3-21	J. A. Kreis & Co.
84B*	McDowell	6.76	G	109,659.49	8-1-21	J. A. Kreis & Co.
85*	Davie	8.28	G	58,756.89	9-26-20	W. E. Graham.
90*	Pamlico	12.03	G	127,981.78	9-16-21	Eagle Engineering Co.
91*	Surry	10.68	G	113,805.84	6-27-21	W. E. Graham—R. W. Curtis & Co.
92*	Surry	10.38	G	133,141.03	6-20-21	W. E. Graham—R. W. Curtis & Co.
93	Franklin-Warren	19.8	G	192,993.57	9-25-20	Chandler & Ragland—Stearns Bros.
96	Yancey	2.95	G	82,653.12	1-10-22	Gibson Construction Co.
98A	Moore	20.53	G	259,240.38	5-31-22	J. T. Plott—J. E. Lane & Co.
98B	Moore	8.75	G	41,055.46	3-8-22	Lee J. Smith Construction Co.
98C	Lee	4.53	G	18,240.64	10-29-21	Gibson Construction Co.
99A	Chatham	12.65	G	126,717.70	8-11-21	T. W. Chandler & State Forces.
100	Avery	14.00	H S	272,089.78	3-20-22	Southern Dray Co.
101A*	Randolph	10.04	G	123,893.99	8-12-21	S. L. Davis—J. A. Kreis & Co.
101B	Randolph	9.64	G	107,928.75	3-6-22	J. T. Plott—Hanford Bros.
103	Duplin	11.32	G	111,931.05	10-20-21	County Commissioners.
105	Hoke	9.8	G	95,501.80	10-25-21	Jameson Brothers—George, Hankins & George.
107	Madison	2.46	G	70,901.40	10--21	Southern Dray Co.
109	Burke	3.58	G	55,191.64	5-21-21	C. E. Teague.
111*	Forsyth	12.22	G	94,447.10	8-17-21	C. B. Hester—Heilig & Sherrill.
112	Caswell	11.93	G	147,065.71	11-2-21	J. M. Gregory & J. E. Lane & Co..
114*	Rowan	2.543	H S	83,587.02	3-17-21	R. M. Hudson & Co.
116	Stanley Montgom'		Bridge	199,614.80	1-9-22	Cornell-Young Co.
121*	Stokes	11.60	G	108,519.62	1-14-22	Jameson Bros.—Rogers & Shumway.
129	Richmond	17.28	G	77,507.48	12--21	Mulligan & Roach.

*Final Settlement Made With Federal Government.

STATUS OF STATE WORK IN NORTH CAROLINA

Projects Under Construction

NO.	COUNTY	LENGTH	TYPE	APPROXIMATE COST	BEGUN	CONTRACTOR
100	Beaufort	10.50	H S	\$ 369,777.70	8-23-21	W. T. Hadlow.
113	Chowan	10.32	G	40,975.73	2-1-22	Nello L. Teer—P. R. Ashby.
114	Chowan	10.00	G	45,064.09	1-4-22	Battershill & Goode—Chandler & Ragland.
125	Edgecombe	15.11	H S	428,438.76	2-28-22	R. G. Lassiter & Co.
137	Halifax	5.67	H S	124,736.97	10-31-21	O. F. Leighton—A. C. House.
139	Halifax		Bridge	18,436.66	10-11-21	Chandler & Ragland—Porter & Peck.
140	Halifax		Bridge	10,542.60	5-5-22	Von Glahn & Talbott.
151	Hyde	4.30	G	71,422.78	12-10-21	C. W. Lacy—Porter & Peck.
154	Martin	11.27	H S	394,090.74	4-17-22	Sou. Willite Paving Co.—O. F. Leighton, Inc.
155	Martin-Pitt	20.00	G	98,176.65	1-12-22	J. P. Dicus—P. R. Ashby.
159	Nash	11.22	G	89,942.43	1-2-22	J. A. Kreis & Co.
160	Franklin-Wake-					
	Nash	9.83	G	53,722.95	1.27-21	Chandler & Ragland—Southern Dray Co.
166	Northampton	0.47	G	17,954.75	3-20-22	W. D. Murray-Sadler Corp.
175	Pasquotank	9.50	H S	217,405.72	4-6-21	County Commissioners.
183B	Pitt		Bridge	32,343.30	3-27-22	B. J. Boyles.
185	Pitt	14.35	G	31,069.72	3-28-22	J. A. Marrow.
186	Pitt	9.75	H S	260,816.60	9-20-21	Cheatwood & Driscoll.
191	Tyrell	6.91	G	57,934.41	1.20-22	C. W. Lacy—M. M. Jones.
195	Washington	15.18	G	65,619.35	2-27-22	L. M. Lee & Co.—B. J. Boyles.

STATUS OF STATE WORK IN NORTH CAROLINA---Continued

Projects Under Construction (Continued)

NO.	COUNTY	LENGTH	TYPE	APPROXIMATE COST	BEGUN	CONTRACTOR
210	Craven	8.34	H S	\$ 287,919.39	4-3-22	West Construction Co.—A. P. Gilbert.
211	Craven	9.93	H S	262,673.20	1-30-22	Union Paving Co.
218	Wayne-Duplin	16.06	G	80,804.50	8-4-21	C. W. Lacy.
227	Greene	6.81	H S	238,113.70	12-19-21	West. Const. Co.—Union Paving Co.
245	Jones	15.76	H S	244,737.90	3-22-22	Hyde & Baker.
263	Pamlico	12.03	H S	289,324.20	3-27-22	Union Paving Company.
280	Wayne	10.01	H S	311,352.36	11-28-21	Union Paving Co.
281	Wayne		Bridge	22,484.88		P. R. Ashby.
291	Wilson	7.63	H S	203,493.18	1-17-22	P. R. Ashby.
300	Bladen	11.99	G	65,178.90	4-8-22	T. W. Chandler—Nello Teer.
301	Bladen	13.17	G	82,028.21	11-21-21	J. F. Mulligan—Powell Paving & Const. Co.
313	Brunswick	3.44	H S	105,389.85	3-15-22	Sou. Willite Paving Co.—Roanoke Bridge & Iron Works.
314	Brunswick	15.82	G	99,326.45	2-23-22	Hagedorn Const. Co.
325	Columbus	11.22	G	105,258.23	11-3-21	J. A. Kreis—Cornell—Young Co.
326	Columbus	13.61	G	195,838.19	5-23-22	J. T. Plott—J. A. Kreis & Co.
338	Cumberland-Sampson		Bridge	26,233.99	10-28-21	Roanoke Bridge & Iron Works.
339	Harnett-Cumb'lnd		Bridge	16,524.75	11-30-21	Porter & Boyd.
364A	Onslow	9.95	G	44,631.40	3-14-22	R. E. Martin.
375	Pender	15.56	G	72,522.92	11-1-21	A. W. McClay.
376	Pender	7.64	G	94,757.85	11-11-21	C. G. Kershaw Const. Co.—Cornell Young Co.
377	Pender-Duplin	1.61	G	76,985.70	3-22-22	R. E. Martin—Hazell—Conerat—Quist Co.
379	Pender	10.00	H S	100,000.00	5-22-22	State Forces
388	Robeson	3.35	H S	137,009.40	11-10-21	C. W. Lacy—Roanoke Bridge & Iron Works.
389	Roberson-Colum	1.56	G	83,463.38	10-26-21	L. A. Chitwood.
400	Chatham		Bridge	57,420.22	4-14-22	R. M. Walker & Co.
409	Durham	0.5	H S	6,140.64	1-13-22	J. P. Dicus.
410	Durham	2.3	H S	83,921.97	2-13-22	C. D. Riggsbee.
411	Durham	5.81	H S	211,574.92	9-1-21	Hutton Eng. & Const. Co.
427	Granville	5.12	H S	159,097.62	12-1-21	R. G. Lassiter & Co.
436	Harnett	21.19	G	144,318.14	6-28-21	C. G. Kershaw Const. Co.—Hobbs & Kitchen.
445	Lee	5.91	G	18,692.85	5-20-22	C. B. Hester.
446	Lee	5.90	H S	197,188.22	5-24-22	Atlantic Bitulithic Co.—O. A. Mann & Co.
453	Orange		Bridge	33,706.80	4-15-22	Geo. W. Kane.
454	Orange	4.29	H S	192,006.15	6-18-21	Elliott, Sholes & Teer.
455	Orange	4.19	G	46,415.77	11-28-21	J. F. Mulligan Const. Co.—P. R. Ashby.
456	Orange	9.00	G	37,459.07	1-7-22	Crawford & Crawford—Nello Teer.
481	Wake	7.20	H S	252,925.15	1-24-22	Union Paving Co.—P. R. Ashby.
482	Wake	6.64	H S	191,669.21	12-8-21	R. M. Hudson Company.
483	Wake	0.54	H S	19,989.75	5-15-22	C. D. Riggsbee.
492	Warren	4.49	H S	100,436.13	4-10-22	Porter & Peck—A. C. House.
501	Alamance	13.10	G	32,627.10	12-7-21	W. M. Shook—Hanford Bros.
505	Alamance	0.42	H S	15,316.40	4-17-22	Hedrick Construction Co.
511	Caswell	14.8	G	74,192.58	12-12-21	White & Simpson—C. B. Hester.
525	Davidson	10.24	H S	363,141.68	12-23-21	Elliott & Sons & Boggs—Austin Bros. Bridge Co.
526	Davidson	3.77	H S	130,826.19	3-4-22	Hagedorn Const. Co.—Heilig & Sherrill.
532	Guilford	11.70	H S	387,499.20	2-1-22	Elliott-Sholes Co.
533	Guilford-Forsyth	10.59	H S	427,997.62	7-11-21	Royer-Ferguson Const. Co.
544	Hoke	10.45	G	32,445.49	5-16-22	O. A. Mann & Co.—J. T. Pigg.
566	Moore	7.14	G	61,380.66	3-6-22	Gibson Const. Co.—Nello Teer.
567	Moore	2.96	G	7,600.43	4-11-22	C. E. Teague.
577	Randolph	13.37	H S	411,375.77	4-18-22	Royer-Ferguson Co., Inc.—J. L. Brinkley.
588	Rockingham	7.98	H S	266,498.43	4-11-22	Cheatwood & Driscoll.
600	Alexander	9.3	G	12,530.98	5-26-22	Bolton Construction Co.
601	Alexander	3.07	G	33,630.45	4-3-22	Gus Ginn, Inc.—R. M. Thurmond.
606	Stanley-Anson		Bridge	54,759.32	3-23-22	Concrete Steel Bridge Co.
607	Anson	6.39	G	40,517.29	3-21-22	Geer & Wilson—Booz-Lloyd & Co.
622	Catawba	10.85	H S	354,684.88	1-23-22	Union Paving Co.
630	Gaston	3.02	H S	98,392.36	10-21-21	W. F. McCanless.
632	Gaston	9.5	H S	291,868.94	1-2-22	Davis-Wilcox Const. Co.
638	Iredell	7.88	H S	244,509.30	10-12-21	Thompson-Caldwell Co.
639	Iredell	10.59	H S	387,448.42	1-2-22	R. M. Hudson Co.—Luten Bridge Co.
653	Mecklenburg	8.84	H S	308,182.44	1-16-22	Union Paving Co.—Luten Bridge Co.
654	Mecklenburg	10.1	H S	302,887.09	4-3-22	Lampton & Burks.
655	Mecklenburg	1.57	H S	62,027.68	12-21-21	Speed-Parker Co., Inc.—Luten Bridge Co.
657	Mecklenburg	13.8	G*	20,000.00	12-8-21	State Forces.
677	Scotland-Robeson	7.11	H S	283,460.21	4-26-22	P. R. Ashby—Chitwood & Palmer.
695	Union	4.3	H S	123,865.28	1-23-22	Redmon Const. Co.
700	Alleghany	7.90	G	132,297.33	6-23-21	W. E. Graham.
701	Alleghany-Wilkes	8.00	G	153,863.60	6-16-21	W. E. Graham.
710	Ashe	3.14	H S	142,687.93	9-8-21	Pittman Const. Co.
724	Caldwell	4.66	G	51,890.66	5-9-22	County Road Comrs—R. M. Thurmond & Co.
725	Caldwell	2.4	G*	10,000.00	12-29-21	County Commissioners.
731	Davie	5.46	H S	195,393.11	3-13-22	G. R. Martin-Heilig & Sherrill.
750	Stokes	14.86	G	93,054.48	9-15-21	J. F. Mulligan Const. Co.—Lee J. Smith.
751	Stokes	7.25	G	31,746.00	10-4-21	W. E. Graham.
760	Surry-Wilkes	6.91	G	24,387.66	2-10-22	W. E. Graham.

STATUS OF STATE WORK IN NORTH CAROLINA---Continued

Projects Under Construction (Continued)

NO.	COUNTY	LENGTH	TYPE	APPROXIMATE COST	BEGUN	CONTRACTOR
780	Wilkes-----	18.00	G*	\$25,000.00	7-25-21	J. F. Mulligan.
781	Wilkes-----	14.50	G*	30,000.00	7-25-21	J. F. Mulligan.
782	Wilkes-----	5.97	H S	184,614.65	3-29-22	Hyde & Baxter.
783	Wilkes-Watauga--	34.40	G*	80,000.00	9-2-21	Chandler & Ragland.
790	Yadkin-----	10.12	H S	308,123.42	4-24-22	Pittman Const. Co.
801	Avery-----	0.99	H S	22,350.24	3-24-22	Geer & Wilson.
811	Burke-----	6.0	H S	189,412.41	1-13-22	Southern Dray Co.
823	Cleveland-----	2.0	H S	81,234.01	1-2-22	Southern Paving Co.—Z. B. Weathers & Son.
833	Henderson-----	10.22	G	38,412.44	1-3-22	S. L. Davis Const. Co.—Asheville Const. Co.
845	McDowell-----	7.19	G	132,177.93	9-6-21	J. W. Stapp Const. Co.—Praytor, Howton Wood Const. Co.
846	McDowell-----	10.06	G	204,680.74	9-12-21	Asheville Const. Co.—W. T. Taylor Const. Co.
855	Mitchell-----	4.97	H S	174,393.78	9-12-21	Fiske-Carter Construction Co.
855B	Mitchell-----		Bridge	7,454.15	4-6-22	Luten Bridge Co.
856	Mitchell-----	4.0	H S	239,005.80	3-20-22	Porter & Boyd—L. J. Chandler & Co.
860	Mitchell-----	5.58	H S	152,908.42	4-21-22	J. F. Mulligan—W. H. Anderson Const. Co.
866	Polk-----	5.96	H S	180,393.40	4-3-22	Dunn & Woodall—Henry Const. Co.
877	Rutherford-----	9.79	G	64,563.73	5-31-21	Geer & Wilson.
878	Rutherford-----	6.55	G	50,913.50	9-22-21	Michaux Const. Co.—Geer & Wilson.
979	Rutherford-----		Bridge	5,737.38	1-9-22	Austin Bros. Bridge Co.
880	Rutherford-----		Bridge	24,679.43	4-4-22	Austin Bros. Bridge Co.
903	Buncombe-----	2.58	H S	100,399.47	4-10-22	Asheville Paving Co.—R. C. Stevens.
904	Buncombe-----	1.60	HS	81,079.35	3-13-22	Asheville Paving Co.—R. C. Stevens.
910	Cherokee-----	7.56	G	76,743.59	5-24-21	Ross Bros.—W. T. Moore Conc. Prod. Co.
911	Cherokee-----	10.33	G	84,475.38	10-25-21	H. A. Wells—Southern Dray Co.
920	Clay-----	4.8	G	54,875.81	1-9-22	E. A. Wilson & Co.—W. T. Moore Conc. Prod. Co.
921	Clay-----	12.37	G	123,929.52	10-24-21	Lee J. Smith Const. Co.—W. T. Moore Conc. Products Co.
930	Graham-----	12.90	G	130,522.00	10-15-21	Lee J. Smith Const. Co.—C. M. Dicus.
940	Haywood-----	7.13	H S	126,082.00	4-14-22	Alexander & Patton—H. A. Brown & Co.
950	Jackson-----	7.56	G	145,313.30	6-13-21	Wright & Nave—O'Brien Const. Co.
960	Macon-----	4.97	G	69,100.57	6-6-21	J. T. Plott—J. E. Lane & Co.
961	Macon-----	4.77	G	58,340.59	12-5-21	J. T. Plott—J. E. Lane & Co.
962	Macon-----	13.58	G	171,310.04	4-24-22	O'Brien Const. Co.—Griffin Const. Co.
970	Madison Yancey---	13.80	G	267,378.26	10-11-21	R. H. Wright & Sons—O'Brien Const. Co.

Projects Completed

209	Craven-----	2.65	H S	\$ 15,688.21	2-15-22	Eagle Engineering Co.
500	Alamance-----	5.22	G	32,732.20	1-17-22	W. W. Tuck & Son—A. M. Hazell, Connerate—Quist Const. Co.
692	Union-----	2.28	H S	65,366.67	12-28-21	Redmon Construction Co.
722	Caldwell-----	7.00	G*	12,000.00	1-18-22	County Forces.
844	McDowell-----	1.80	H S	57,048.42	12-28-21	Bolton Construction Co.
942	Haywood-----	0.57	G	5,294.46	2-1-22	O'Brien Construction Co.

*Reconstruction only.

PROJECTS UNDER CONTRACT

NO.	COUNTY	LENGTH	TYPE	APPROXIMATE COST	CONTRACTOR
138A	Halifax-North-				
	ampton-----	12.59	G	\$ 131,712.13	Nello Teer—Richards Bros.
196	Washington-----	14.93	G	82,099.60	W. N. Thompson—Nello Teer.
272	Sampson-----	16.47	G	98,807.39	R. E. Martin—Striblin—Staudy & Newell.
312	Brunswick-----	9.77	H S	315,406.30	Alabama Conc. Prod. Co.—Batson-Cooke Co.
316	Brunswick-----	12.12	G	78,370.21	B. F. Price—Batson-Cooke Co.
327	Columbus-----	5.2	G	37,515.94	J. A. Kreis
340	Cumberland-----	11.07	H S	380,291.24	Alabama Conc. Prod. Co.—Hobbs & Peabody.
364-B	Onslow-----	12.84	G	98,874.10	A. W. McClay.
378	Pender-----	13.59	H S	213,502.96	C. W. Lacy.
428	Granville-----	4.19	H S	142,637.77	Pittman Const. Co.
493	Warren-----	3.88	H S	77,866.80	Porter & Peck.
502	Alamance-----	17.43	G	143,098.50	W. E. Graham—Hanford Bros.
503	Alamance-----		Bridge	59,450.38	Atlantic Bridge Co.
504	Alamance-----	5.22	H S	154,127.16	Elliott-Sholes Co.
538	Guilford-----		Bridge	7,555.90	J. L. Brinkley.

STATUS OF STATE WORK IN NORTH CAROLINA---Continued

PROJECTS UNDER CONTRACT (Continued)

539	Guilford.....	0.6	H S	\$21,639.20	R. G. Lassiter & Co.
545	Hoke.....	9.2	G	56,708.30	O. A. Mann & Co.—A. W. McClay.
593	Rockingham-Caswell	17.98	H S	525,393.22	J. A. Kreis
614	Cabarrus.....	9.20	H S	328,085.06	A. L. Harris-Oliver & Costello Bros.
629	Catawba.....	8.4	H S	268,662.48	A. L. Harris—R. M. Thurmond & Co.
647	Lincoln.....	7.10	H S	250,108.15	A. L. Harris—R. M. Thurmond & Co.
670	Cabarrus-Rowan..	4.53	H S	141,506.86	Southern Construction Company
719	Caldwell.....		Bridge	4,903.25	Cottrell & Howard.
741	Forsyth.....	8.90	H S	286,387.10	Hardaway Construction Company.
913	Cherokee.....	10.33	H S	95,554.80	Mills, Williams Construction Company.
951	Jackson.....	11.85	H S	249,546.00	R. H. Wright & Sons—W. T. Moore Conc. Prod. Co.
953	Jackson.....	12.72	G	116,283.75	C. C. McCabe.
954	Jackson.....	1.68	H S	90,684.33	Mills, Williams Construction Company.
980	Macon-Swain.....	17.9	G	344,161.29	E. A. Wilson & Co.—Southern Dray Co.
990	Transylvania.....	8.87	G	151,238.89	Sam. L. Davis Const. Co.—R. C. Stevens.

Summary

	NUMBER OF PROJECTS			MILEAGE		APPROXIMATE TOTAL COST		
	H S	G	BRIDGE	H S	G	H S	G	BRIDGE
UNDER CONSTRUCTION								
Federal Aid Projects.....	2	16	1	9.25	172.78	\$ 195,816.88	\$2,035,955.63	\$ 332,308.83
State Projects.....	57	59	12	389.22	597.40	12,028,289.31	4,415,246.53	310,323.48
Total Under Construction...	59	75	13	398.47	770.18	12,224,106.19	6,451,202.16	642,632.31
UNDER CONTRACT								
Construction not yet begun								
Federal Aid Projects.....	16	11	3	128.29	140.27	3,541,399.43	1,338,470.10	71,909.53
State Projects.....	16	11	3	128.29	140.27	3,541,399.43	1,338,470.28	71,909.53
Total Under Contract.....	16	11	3	128.29	140.27	3,541,399.43	1,338,470.28	71,909.53
COMPLETED								
Federal Aid Projects.....	29	65	3	143.18	590.02	4,745,739.45	5,362,603.75	309,637.70
State Projects.....	3	3		6.73	12.79	238,103.30	50,026.66	
Total Completed.....	32	68	3	149.91	602.81	4,983,842.75	5,412,630.41	309,637.70

Total mileage of Hard Surface work under construction or contracted for..... 526.76
 Total mileage of Topsoil, Sand Clay or Gravel work under construction or contracted for..... 910.45

Total mileage under construction or contracted for..... 1,437.21

Total cost of Hard Surface work under construction or contracted for..... \$ 15,765,505.62
 Total cost of Topsoil, Sand Clay or Gravel work under construction or contracted for..... 7,789,672.26
 Total cost of Bridge work under construction or contracted for..... 714,541.84

Grand Total cost of work under construction or contracted for..... \$ 24,269,718.72

Total mileage of Hard Surface work completed..... 149.91
 Total mileage of Topsoil, Sand Clay or Gravel work completed..... 602.81

Total mileage of work completed..... 752.72

Total cost of Hard Surface work completed..... \$ 4,983,842.75
 Total cost of Topsoil, Sand Clay, or Gravel work completed..... 5,412,630.41
 Total cost of Bridge work completed..... 309,637.70

Grand Total of all work completed..... \$ 10,706,110.86

Corrected to June 1, 1922.

Grade Crossing Accidents

OUT of 12,000 persons killed on the highways of the country last year, 7,000 were struck down at grade crossings. Investigation has shown also that one motorist in every three is careless at grade crossings, approaching the railroad tracks at reckless speed and without taking due notice of approaching trains.

The Pennsylvania and Southern Pacific railroads, especially, have been heavy sufferers from grade crossing accidents. On the Southern Pacific lines alone during the past three years 1909 motor cars and trucks were wrecked at grade crossings. In 490 cases, or more than twenty per cent, the motorists deliberately ran into the trains. In 122 instances autos plunged through the crossing gates. Nine crossing flagmen were struck down.

In 970 cases in which motorists ran in front of the trains 136 persons were killed and 405 were injured. In 490 cases motor cars stalled on the crossing and were demolished. Forty-three cars actually collided with the danger signals.

An investigation conducted recently by the Maryland State Roads Commission demonstrated that most highway accidents occur on long stretches of road instead of at curves and due to speeding or reckless driving, rather than skidding.

A total of \$4,500,000 was paid out in death claims by American insurance companies for the 12,000 persons killed on the highways last year. In addition to the fatalities there were 1,500,000 non-fatal injuries.

Stop!

Look!!

Live!!!

Tar-mac

MAKES GOOD ROADS

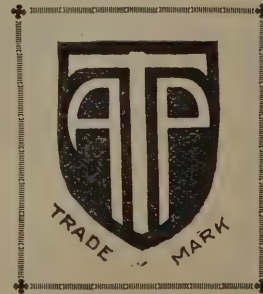
A scientifically prepared coal tar for the construction and maintenance of roads and streets.

YOUR INQUIRIES
ARE SOLICITED

AMERICAN TAR PRODUCTS COMPANY

208 SOUTH LA SALLE STREET
CHICAGO

J. WILSON WOOD
North Carolina Sales Agent
Raleigh, N. C.



SLAUGHTER CULVERT COMPANY

300 - 301 MASONIC TEMPLE

RALEIGH



Metal Culvert

Concrete Culvert

Washed and Screened Sand Gravel Crushed Stone

Conforming to the specifications of the North Carolina
State Highway Commission.

Prompt shipments by rail or water

Favorable freight rates to all North Carolina points.

Quotations gladly furnished on request.

THE ARUNDEL CORPORATION

MAIN OFFICE:

Pier 2 Pratt St.
Baltimore, Maryland

BRANCH OFFICE:

519 Board of Trade Bldg.
Norfolk, Virginia

A RUSSELL ROAD MACHINE FOR EVERY NEED

Before deciding upon a road machine let us assist you by suggesting what we consider best for your requirements. We make this offer because we know that this is one of your problems. The first thing to decide upon is whether you want a machine for construction or maintenance; for horse power or tractor power.

For Construction buy the largest machine for which power is available. The *Russell Mogul* with a 12-foot blade and a 25-horse power tractor will construct your roads most economically.

The *Russell Reliance*, with a 10-foot blade, ranks next to the Mogul. With this machine we suggest at least a 20-horse power tractor.

The *Russell Special* is a combination machine for which you may use a 15-horse power tractor or 8 or 12 horses. It is equipped with an 8-foot blade and is often preferable over the Standard for use with animal power in stony or stumpy soil.

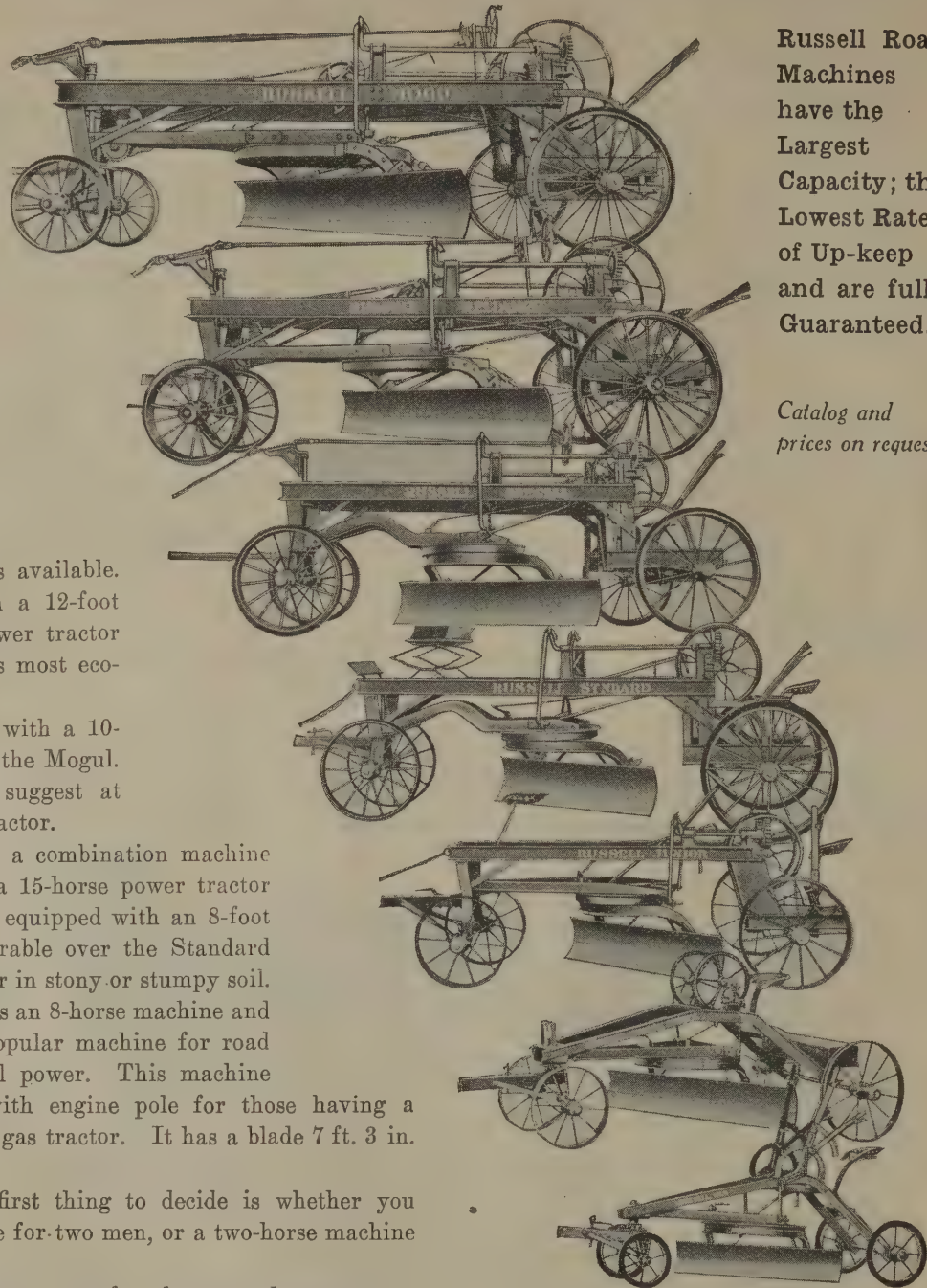
The *Russell Standard* is an 8-horse machine and is, no doubt, the most popular machine for road construction with animal power. This machine may also be equipped with engine pole for those having a small 8 to 15-horse power gas tractor. It has a blade 7 ft. 3 in. long.

For Maintenance the first thing to decide is whether you want a four-horse machine for two men, or a two-horse machine for one man.

For those who are willing to put four horses and two men on the grader, the *Russell Junior* will do maintaining work more effectively than any other grader. This machine has a 6-foot blade and may be used for light road construction as well as maintenance.

The *Russell Hi-Way Patrol* grader is built especially for greatest efficiency in patrol and maintenance work with two horses and one man. It is lighter than the Junior and is equipped with a 6-foot blade. Blade is operated by worm and gear lift, giving the finest kind of adjustment.

The *Russell Gem* is the cheapest of the high-framed type machines. It is equipped with 5-foot, one-piece, reversible blade. The blade is operated by lever. It is a one-man, two-horse machine.



Russell Road Machines have the Largest Capacity; the Lowest Rate of Up-keep and are fully Guaranteed.

Catalog and prices on request.

E. F. CRAVEN, "THE ROAD MACHINERY MAN"
STATE DISTRIBUTOR GREENSBORO, NORTH CAROLINA
COMPLETE LINE OF MACHINES AND REPAIRS IN STOCK

We are Distributors for Virginia, North and South Carolina for the Following New Equipment:

Air Compressors, Locomotives, Street Cleaning tools and machines, Road pumps, Trench pumps, Steam pumps, Sand pumps, Steam, electric and gasoline hoists, Cranes of all types, Fire apparatus, Asphalt tools, Motor trucks, Trailers, Pavers, Building Mixers, Light mixers, Concrete chute systems—complete, Mortar mixers, Saw rigs, Graders, Asphalt pumps and distributors, Dump bodies, Conveyors, Elevators, Road Graders, Crushers, Scarifiers.

We have a full line of used machinery a great deal of which is owned outright by us and has been fully rebuilt in our own shops in Norfolk.

If you want anything in the way of used machines that must be about as good as new write us.

At this time we have going through our shops, rebuilding, the following:

Ten ton steam roller, Five ton tandem roller, One bag light mixer, 3½ ton Kelly Truck, Monarch Tractor, Three hoisting engines, Two air compressors, Pipe thread-

ing machine, 44 ins. engine lathe, 5 ton Alco Truck, 5 drill presses, No. 3. Keystone shovel, one paving mixer, etc., etc., etc.

We have a full line of slightly used plants on which we can save you money.

Let us have your inquiries.

We have a number of good pieces of plant that we will rent to responsible people.

This will save you buying equipment for the small contracts.

We have to rent now: No. 3 Keystone Hoisting engine D. C. 7 x 10, D. D. with boiler. Ten ton steam roller, Five ton tandem roller, 30 h. p. crawler type tractor, Thew Steam shovel, Two small air compressors with gasoline engines, Air compressor with electric motor, 21-S Mixer with boiler, engine, sideloader and tank, One-bag gasoline mixer loader and tank, 1250 yard Asphalt plant-complete.

All above plant is our own property and fully guaranteed.

Write us for terms.

We can use a few good sub-agents in the larger towns in all three states. If you visit contractors and can sell machinery we can put you in position to make some good extra money.

Sixteen years in business—our customers our references

LEWTER F. HOBBS, INC.
NORFOLK, VA.

Offices and show rooms
113-115 East Twelfth St.

Private Telephone Exchange
23908

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835-837 West 38th. St.



**Permanent
Construction**

Concrete

**Minimum
Maintenance**

Solves the Road Problem

The concrete road is gaining in favor in all parts of the United States. Whether laid in North or South, East or West, in all varieties of climate and under widely varying conditions, the concrete road is meeting with success and is solving the problem of securing a roadway at reasonable cost that will stand up under modern traffic conditions.

Public approval and appreciation of the concrete road is based upon practical observation as to its extreme utility, reasonable first cost and the almost negligible outlay required for maintenance.

The most important question in road building today is that of maintenance.

The one aim and desire of road officials and engineers has been to find a material, the use of which would keep maintenance charges at a minimum.

In Bellefontaine, Ohio, the maintenance cost of a concrete road put down 20 years ago has averaged only one-fourth of a cent per square yard per year.

In Wayne County, Michigan, the maintenance on 60 miles of concrete road laid 1909 to 1912 was less than one-sixth of a cent per square yard for three years.

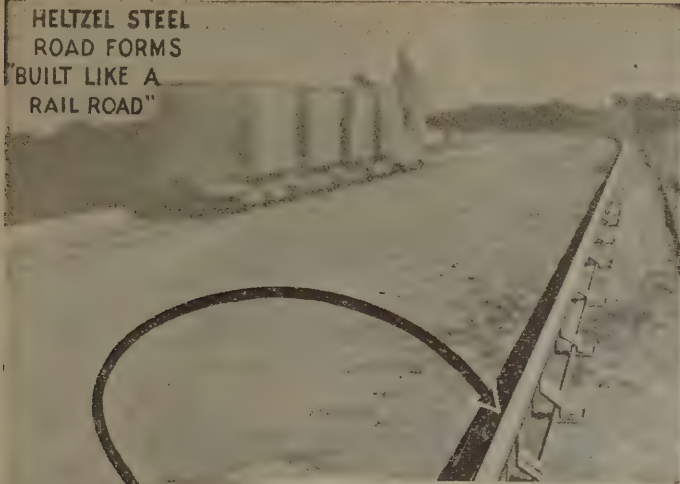
Concrete, therefore, completely answers the maintenance question.

And this combined with reasonable first cost makes it the ideal material for a modern road to meet modern conditions.

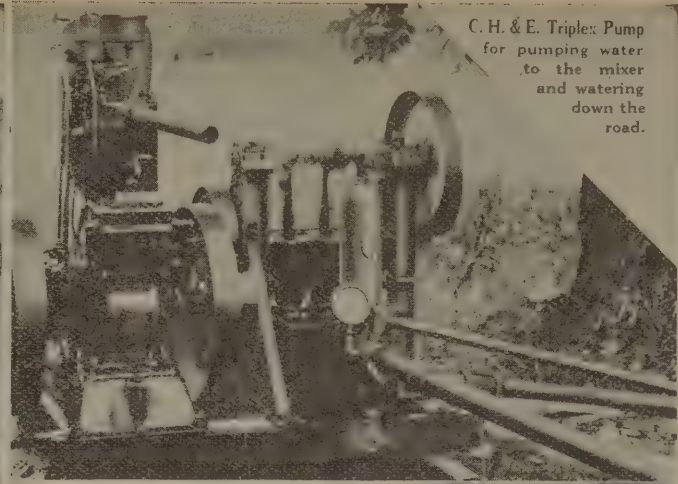
CLINCHFIELD PORTLAND CEMENT CORP.

Office and Mills: KINGSFORT, TENN.

**HELTZEL STEEL
ROAD FORMS
"BUILT LIKE A
RAIL ROAD"**



**C. H. & E. Triplex Pump
for pumping water
to the mixer
and watering
down the
road.**



UTILITIES

GENERAL

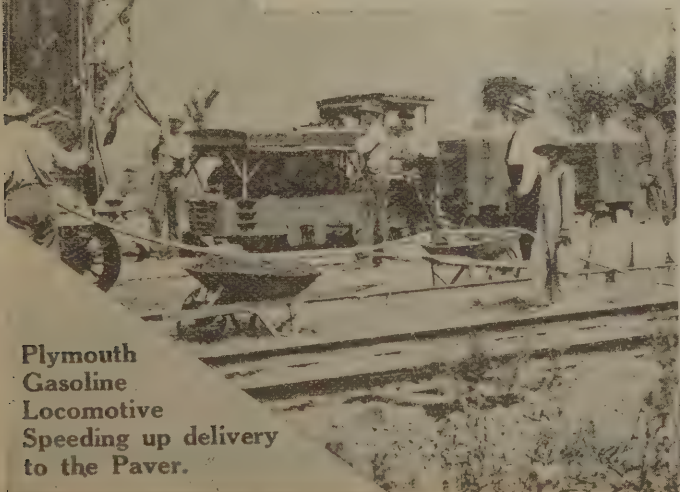
COMPANY

**Steam Shovels
Mixers
Pumps
Stone Loaders
Hoists**

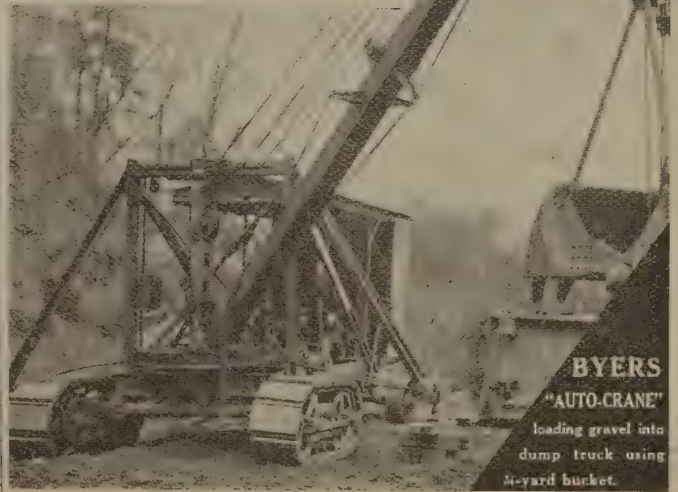
**Steel Forms
Cranes
Derricks
Conveyors
Gasoline Locomotives**

**This Barber-Greene Loader replaced 13 laborers.
See one with crawler traction on the
Norfolk-Virginia Beach Road.**

NORFOLK, VA.



**Plymouth
Gasoline
Locomotive
Speeding up delivery
to the Paver.**



**BYERS
"AUTO-CRANE"
loading gravel into
dump truck using
4-yard bucket.**

GEO. E. HOPPE, PRES.

GRAHAM B. BRIGHT, V.-P. and SALES MGR.

Tractor & Machinery Sales Co.

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RICHMOND

VIRGINIA

We Offer You the Following Lines:

HOLT "CATERPILLAR" TRACTORS

LAKEWOOD ENGINEERING CO.

LAKEWOOD MIXERS
LAKEWOOD-MILWAUKEE MIXERS
LAKEWOOD-UNIVERSAL MIXERS
MORTAR MIXERS
CONCRETE PLACING PLANTS, TOWERS,
HOPPERS, BUCKETS, CHUTES, BIN
GATES, ETC.
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ROAD DRAGS
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MOTOR PICK-UP SWEEPERS
STREET SWEEPERS
STREET SPRINKLERS

PAWLING & HARNISCHFEGGER CO.

BAKER MANUFACTURING CO.

Baker--Maney Wheelers

We also offer a full line of Slow Speed Trailers for all purposes; in fact, anything it takes to build or maintain a Street or Road.



Fort Fisher Highway, New Hanover Co., N. C. Treated with "Tarvia-B" 1915-17-18-19 and "Tarvia-A" in 1916.



Above is Wrightsville Turnpike, New Hanover Co., N. C. Treated with "Tarvia-A" 1915, and with "Tarvia-B" 1917.



Another view of Fort Fisher Highway.

"The Best Investment The Board Ever Made"

Mr. Addison Hewlett, Chairman of the Board of Commissioners of New Hanover County, N. C., writes, under date of July 25, 1921:

"We have been using Tarvia for surface treating the macadam roads of New Hanover County for the past six years, and we find this treatment satisfactory in every respect.

"Before we started the use of Tarvia we had great difficulty in maintaining our roads, as they became very dusty in dry weather and washed away in wet weather, leaving our road surface full of holes and ruts. Since using Tarvia the surface of the roads has been well protected in all kinds of weather, and today our roads have smooth, hard surfaces and our maintenance problem has been very easily solved. The Tarvia treatment is very inexpensive.

"It is unquestionably the best investment the Board of Commissioners has ever made and the Commissioners would not consider for a moment discontinuing Tarvia on our roads."

Tarvia
For Road Construction
Repair and Maintenance

Additional comments on Tarvia are made by R. A. Burnett, County Superintendent of Roads:

"Tarvia treatments are given to some of our roads every year while other roads, such as the Wrightsville Turnpike, have lasted as long as three years before requiring another treatment.

"These treatments have cost us in the neighborhood of \$300 per mile per year and have proved to be the best, easiest and cheapest method of maintaining our roads. We have always had the best of co-operation from your engineers . . .

"We feel that we have a finer system of roads than any other county in the State."

No matter what your road problems may be—new construction, maintenance, or repairs—there is a grade of Tarvia made especially for the purpose.

Write for free illustrated booklet describing the various uses of Tarvia

36th and Grey's
Ferry Avenue

The *Barrett* Company

Branches in All
Leading Cities

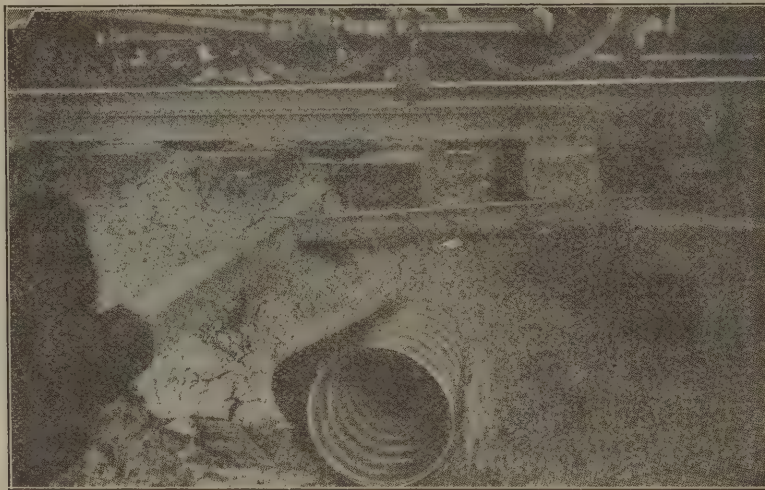


PHILADELPHIA, PA.



PURE IRON LASTS LIKE THIS

Pure iron nails from coffin of soldier buried at Fort St. Clair, Ohio, U. S. A. After being 100 years in the ground, they are practically undamaged by rust. Analysis shows them to be 99.83% pure iron, containing only the merest traces of carbon, copper and sulphur.



The Engineer of the Atlanta Terminal Company says that the Armco Culvert pictured here is in such good condition today that it ought to last several times the ten year period during which it has already withstood the acid waters which go thru it in the Railroad yards, as well as the pounding of the 450,000 heavy trains which have gone over it.



THE DIXIE CULVERT AND METAL COMPANY

Little Rock, Ark.

ATLANTA, GA.

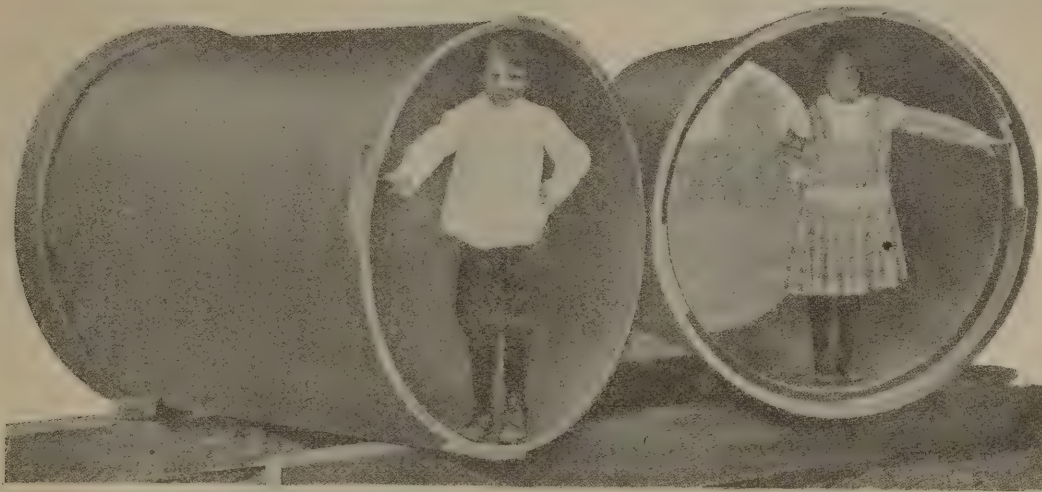
Jacksonville, Fla.

J. GRANVILLE BALDWIN,
Charlotte, N. C.

W. H. McNEILL,
Lakeview, N. C.



Long Years of Life Ahead of Them



National Lock-Joint Cast-Iron Pipe

The Pipe of Short Units, Long Service *and* Low Costs

*The Pipe that locks effectively, that prevents Separation
and assures alignment to perfection.*

The pipe which solves culvert renewal problems with least expense, greatest efficiency. The pipe that does not rot or disintegrate, the pipe that is mechanically correct and has proved itself the solution of the culvert problem.

CONTRACTORS *and* ENGINEERS, GET THIS:

TWO MEN, without the use of any tools whatsoever, will unload, handle and install all sizes up to and including 36 inches in diameter.

It is as cheap to handle and install as clay pipe WITH NO BREAKAGE LOSS. In shallow trench work the entire culvert can be built up, interlocked and rolled into place in one operation.



AMERICAN
CASTING CO.
Birmingham, - - Alabama
T. B. TURNER & CO.
Raleigh, : : North Carolina

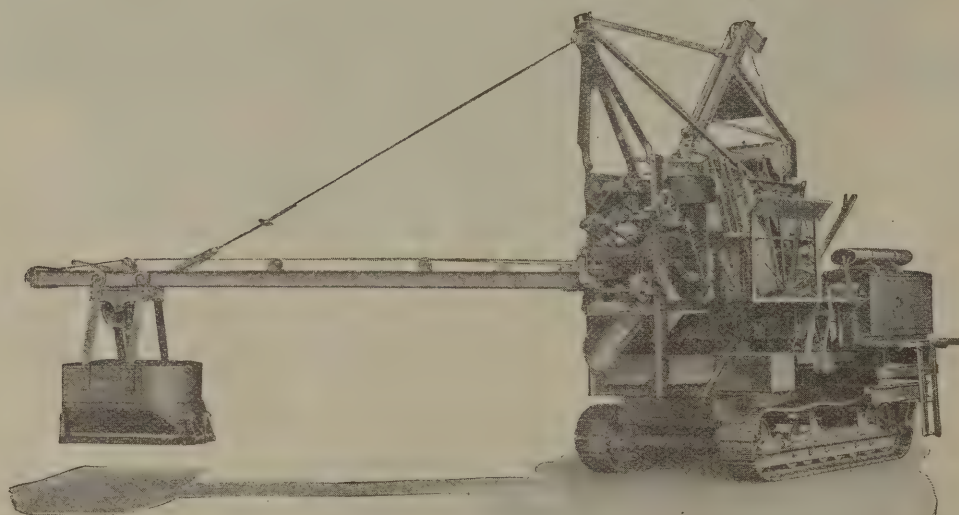


FOOTE BUILT THE FIRST PAVER WITH CATERPILLAR TYPE TRACTION

And having gone entirely through the experimental stage now offers to contractors the perfected "MultiFoote"

CONSIDER THESE FEATURES:

- 1—No planking or delays in moving, made possible by full length cast steel self-cleaning tread.
- 2—Absolute one-man control; from high operating platform, thus giving operator full view of all operations.
- 3—Fast mixing and discharging, due to patented double cone drum
- 4—Thoroughly dependable heavy duty skip hoist, (developed from suggestions of North Carolina contractor.)



"A MultiFoote User is a MultiFoote Booster"

Built in two sizes---14 E and 21 E, with boom and bucket or gravity chute
with steam or gas power

GENERAL SOUTHERN AGENT

BURTON FRANKLIN, Chattanooga, Tenn.

NORTH CAROLINA AGENT

E. F. CRAVEN, "The Road Machinery Man," Greensboro, N. C.

Alabama begins a big Federal Aid Program of Highway Construction



55 miles

of hard surface
roads will be
built with

"ENSLEY" & "ALA CITY"
BASIC SLAG
CRUSHED & SCREENED

"The Superior Road Metal."

28 miles of Asphaltic Slag Concrete Roads

F. A. P. No. 82 (Cullman County)—8 miles of Asphaltic Slag Concrete 18 ft. wide; 2-inch wearing surface on 6-inch waterbound slag macadam base; road runs from Cullman to Guntersville, Ala.

F. A. P. No. 83 (Morgan County)—10 miles of Asphaltic Slag Concrete; continuation of F. A. P. No. 82 which runs from Cullman, Ala., to Guntersville.

F. A. P. No. 106 (Etowah County)—10 miles of Asphaltic Slag Concrete, 16 ft. wide, from Gadsden to St. Clair County line.

27 miles of Penetration Slag Macadam Roads

F. A. P. No. 88 (Marshall County)—18 miles of Penetration Slag Macadam, 18 ft. wide, 2½ inch wearing surface. This road is on Dixie Highway and extends from Tennessee river to Boaz, Ala.

F. A. P. No. 76 (Sumter County)—9 miles of Penetration Slag Macadam, 16 ft. wide; 2½ inch wearing surface on 6-inch waterbound slag macadam base; this road runs from Livingston, Ala., toward the Tombigbee river.

It's a significant fact, isn't it, that most of the roads that have been built—or that are being built—under State and Federal Aid direction are "Slag-built" roads.

Birmingham Slag Company

Slag Headquarters for the South

ATLANTA, BIRMINGHAM, THOMASVILLE



GOOD MATERIAL

— FOR A —

GOOD ROAD

IS ESSENTIAL

LEHIGH PORTLAND CEMENT

has been used in the construction of
some of the best highways in the
country because of its

Quality and the Service of the

LEHIGH PORTLAND CEMENT COMPANY

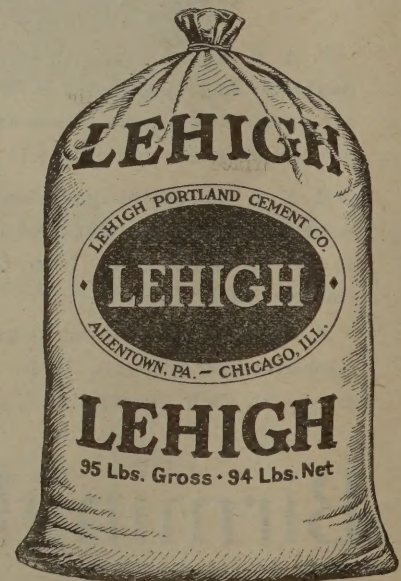
ALLENTOWN, PA.

RICHMOND, VA.

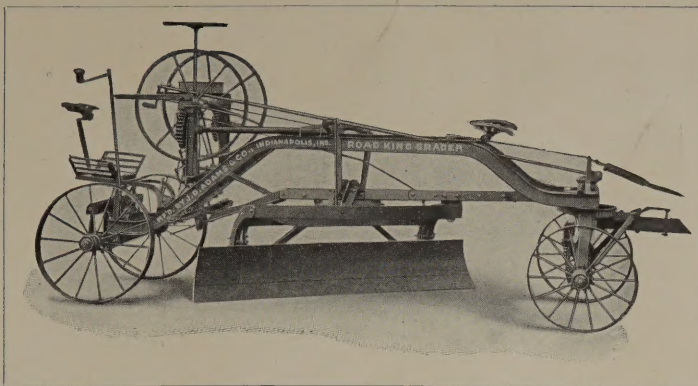
OFFICES *and* MILLS

from

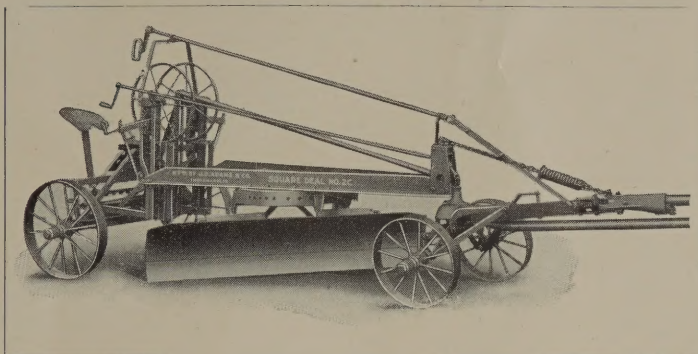
COAST *to* COAST



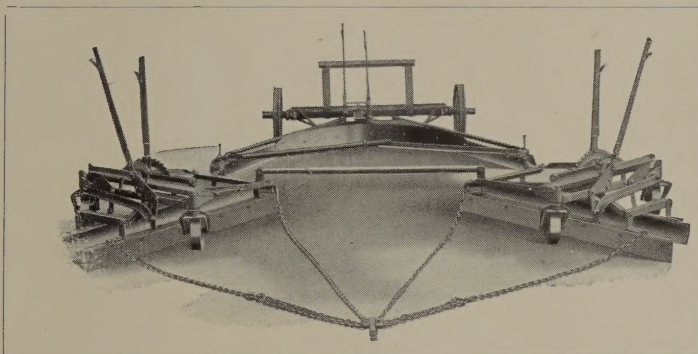
MOST MILES OF GOOD ROADS PER DOLLAR



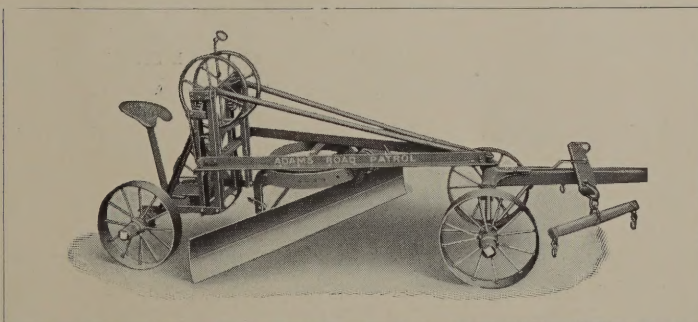
ROAD KING GRADER, 8-FOOT BLADE



SQUARE DEAL No. 2-C, 7-FOOT BLADE



ADAMS ROAD MAINTAINER



ADAMS ROAD PATROL SCRAPER

translated into working terms means Adams Road Building and Maintenance Equipment

For your road building grading use

ADAMS ADJUSTABLE LEANING WHEEL GRADERS

that are guaranteed to do more work for you with less power and therefore less cost, than any other graders on the market. The difference is in the leaning wheels—an exclusive feature on Adams Graders.

They are built with blades ranging from 7 ft. to 12 ft. long. There's a size to suit your work that can be furnished either for animal or tractor power.

To keep your roads always smooth and properly crowned, use

ADAMS ROAD MAINTAINER

a flexible machine which shapes both sides and crowns the center of the road in one operation, preserving the original contour of the road. Operated by one man and a truck or light tractor, it covers many miles of road a day, making the maintenance cost per mile very low. Adjustable to all road widths and conditions.

ADAMS ROAD PATROL

a mighty popular little one-man, two-horse maintenance machine for maintaining roads by the patrol system. Thousands in use all over the country.

We also manufacture a superior line of Road Drags, Scarifiers, Scrapers, Plows, etc.

WRITE OUR LOCAL DISTRIBUTOR
J. C. BENJAMIN, RALEIGH, N. C.
733 W. HARGETT ST.

J. D. ADAMS & COMPANY
HOME OFFICE AND FACTORY
INDIANAPOLIS, INDIANA

GET IN TOUCH WITH OUR LOCAL DISTRIBUTOR — HE IS THERE TO SERVE YOU

WHAT FABRIC IS

Made For One Purpose

Two Types Of Mesh

From Ore To Finished Product

Physical Properties

Weld Is Stronger Than The Wire

Stronger Than Bars

NATIONAL ROAD FABRIC

NATIONAL Road Fabric is a wire fabric, designed and manufactured for reinforcing concrete roads. (See list of "styles" on page 14)

The fabric is made up either of

1. A series of main wires spaced and held (rigidly) equidistant apart by means of secondary wires which are welded (fused) to the former, at all intersections, by the electric welding process; or

2. A series of main and secondary wires, all spaced and held equidistant apart, and welded at all intersections, as above noted.

The main wires of the rectangular (1) type of mesh take care of load stresses, while the secondary wires take care of temperature stresses and at the same time act as "spacers" for the main wires; the square (2) type of mesh gives equal cross-sectional area in both directions.

We control every step in the manufacture of National Road Fabric—from ore to finished product. The fabric is manufactured from a very high-grade steel wire, which is cold-drawn in our own plant. This wire will develop an average tensile strength of 75,000 pounds per square inch; the average yield point is 40,000 pounds; the material will bend, cold, 180 degrees around one diameter without fracture.

The welding, or, more properly, the fusing of the secondary wires to the main wires is accomplished by means of electricity.

Exhaustive tests have proven that the welding process does not have a weakening effect upon the fabric, either longitudinally or transversely; on the other hand, tensile tests upon individual wires taken from pieces of fabric prove the weld to be the strongest part of the wire.

The advantages of National Road Fabric over bar reinforcing of an equal cross-sectional area are obvious; in the first place, the fabric is infinitely easier to handle and to place; in the second place, the fabric is much stronger than the bars, because the cold-drawn steel wires, of which the former is manufactured, have much better physical properties than hot-rolled bars of equal cross-sectional area.

To get the same resistance to tensile stresses, some state specifications require at least 50% more cross-sectional area when comparing alternate designs of bar and fabric reinforced concrete roads.

The tensile strength of the steel in a welded fabric is more fully developed in the concrete than is possible when bars are used. For example, four No. 3 wires have an area of .1866 square inches and a total circumference, or bonding surface, of 3.06 inches, whereas a 1 1/2" bar has about the same 1.57-inch circumference, or bonding surface. (See page 17, Testing Laboratory, page 17.)

When National Road Fabric is used in concrete, the fabric is infinitely easier to handle and to place; in the second place, the fabric is much stronger than the bars, because the cold-drawn steel wires, of which the former is manufactured, have much better physical properties than hot-rolled bars of equal cross-sectional area.

NATIONAL ROAD FABRIC

GENERAL practice in reinforced concrete construction limits the spacing of main steel members to the depth of the slab, or less, in order to get the best distribution of steel. In reinforced concrete road construction, this usually means a maximum space of 8" for steel members placed perpendicular to the center line of the road, which makes the use of bars almost economically prohibitive.

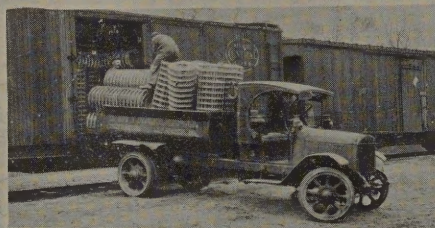
Furthermore, loose bars or even hand-tied bars may assume almost any position in the slab before final set of the concrete, whereas the rigid, flat sheet of fabric is certain to remain in the position where originally placed.

National Road Fabric is from 5% to 20% more "effective" than a woven wire fabric of the same total weight—because from 5% to 20% of the steel used in the manufacture of a woven wire fabric is wasted in ties or wraps, which are "ineffective" in resisting tensile stresses.

Another feature of National Steel Fabric is the fact that it can be furnished made up of wires having the same cross-sectional area in both directions—a woven fabric has certain limitations in this respect, due to the fact that only the lighter gauges of wire can be used for "weaving." Thus, National Steel Fabric obviates the necessity for laying two courses of reinforcement, when the design requires equal cross-sectional area in both directions.

National Road Fabric assures a more dense, perfectly bonded concrete, free of voids—this is due to the fact that the numerous small wires offer less resistance to the free flow of the aggregate than either bars or the "ties" of a woven fabric.

National Road Fabric provides the greatest amount of strength for a given amount of steel, and, at the same time, minimizes the cost of transportation, handling, and placing the reinforcement.



One Truck With Driver and Two Helpers Will Unload and Hoist a Carload of 12 Rolls of Style #20 National Steel Fabric 1 1/2" Mesh in 10 Hours

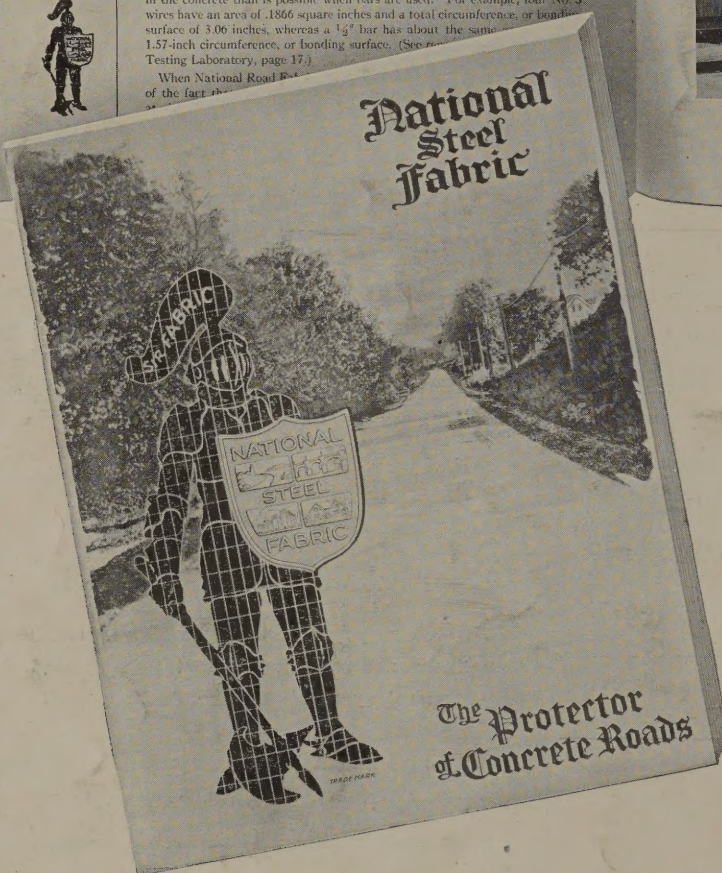
ITS ADVANTAGES

Bars are Uneconomical

Woven Fabric Ineffective

Equal Area In Both Directions

No Voids



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